#20
SK
8/8/00

1644

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         RAW SEQUENCE LISTING              DATE: 07/24/2000
         PATENT APPLICATION:  US/09/060,872   TIME: 17:01:07

            Input Set : A:\GC527D2.APP.txt
            Output Set: N:\CRF3\07242000\I060872.raw

      3 <110> APPLICANT: Estell, David
      4        Harding, Fiona
      6 <120> TITLE OF INVENTION: Mutant Proteins Having Lower Allergenic Responses in
      7        Humans and Methods for Constructing, Identifying and
      8        Producing Such Proteins
     10 <130> FILE REFERENCE: GC 527-D2
C--> 12 <140> CURRENT APPLICATION NUMBER: US/09/060,872
C--> 13 <141> CURRENT FILING DATE: 1998-04-15
     15 <160> NUMBER OF SEQ ID NOS: 7
     17 <170> SOFTWARE: PatentIn Ver. 2.0
     19 <210> SEQ ID NO: 1
     20 <211> LENGTH: 1494
     21 <212> TYPE: DNA
     22 <213> ORGANISM: Bacillus amyloliquefaciens
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     25 <221> NAME/KEY: CDS
     26 <222> LOCATION: (96)..(1244)
     28 <220> FEATURE:
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     30 <222> LOCATION: (417)..(1241)
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     35 ttattctgca aatgaaaaaa aggagaggat aaaga gtg aga ggc aaa aaa gta   113
     36                                         Val Arg Gly Lys Lys Val
     37                                             -105
     39 tgg atc agt ttg ctg ttt gct tta gcg tta atc ttt acg atg gcg ttc  161
     40 Trp Ile Ser Leu Leu Phe Ala Leu Ala Leu Ile Phe Thr Met Ala Phe
     41  -100              -95               -90
     43 ggc agc aca tcc tct gcc cag gcg gca ggg aaa tca aac ggg gaa aag  209
     44 Gly Ser Thr Ser Ser Ala Gln Ala Ala Gly Lys Ser Asn Gly Glu Lys
     45 -85         -80               -75               -70
     47 aaa tat att gtc ggg ttt aaa cag aca atg agc acg atg agc gcc gct  257
     48 Lys Tyr Ile Val Gly Phe Lys Gln Thr Met Ser Thr Met Ser Ala Ala
     49              -65               -60               -55
     51 aag aag aaa gat gtc att tct gaa aaa ggc ggg aaa gtg caa aag caa  305
     52 Lys Lys Lys Asp Val Ile Ser Glu Lys Gly Gly Lys Val Gln Lys Gln
     53              -50               -45               -40
     55 ttc aaa tat gta gac gca gct tca gct aca tta aac gaa aaa gct gta  353
     56 Phe Lys Tyr Val Asp Ala Ala Ser Ala Thr Leu Asn Glu Lys Ala Val
     57          -35               -30               -25
     59 aaa gaa ttg aaa aaa gac ccg agc gtc gct tac gtt gaa gaa gat cac  401
     60 Lys Glu Leu Lys Lys Asp Pro Ser Val Ala Tyr Val Glu Glu Asp His
     61      -20               -15               -10
     63 gta gca cat gcg tac gcg cag tcc gtg cct tac ggc gta tca caa att  449
     64 Val Ala His Ala Tyr Ala Gln Ser Val Pro Tyr Gly Val Ser Gln Ile
     65  -5              -1  1     Ser Val Pro  5  Gly Val Ser     10
     67 aaa gcc cct gct ctg cac tct caa ggc tac act gga tca aat gtt aaa  497
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RAW SEQUENCE LISTING   DATE: 07/24/2000
PATENT APPLICATION: US/09/060,872   TIME: 17:01:07

Input Set : A:\GC527D2.APP.txt
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69             15                  20                  25
71 gta gcg gtt atc gac agc ggt atc gat tct tct cat cct gat tta aag    545
72 Val Ala Val Ile Asp Ser Gly Ile Asp Ser Ser His Pro Asp Leu Lys
73             30                  35                  40
75 gta gca ggc gga gcc agc atg gtt cct tct gaa aca aat cct ttc caa    593
76 Val Ala Gly Gly Ala Ser Met Val Pro Ser Glu Thr Asn Pro Phe Gln
77       45                  50                  55
79 gac aac aac tct cac gga act cac gtt gcc ggc aca gtt gcg gct ctt    641
80 Asp Asn Asn Ser His Gly Thr His Val Ala Gly Thr Val Ala Ala Leu
81  60                  65                  70                  75
83 aat aac tca atc ggt gta tta ggc gtt gcg cca agc gca tca ctt tac    689
84 Asn Asn Ser Ile Gly Val Leu Gly Val Ala Pro Ser Ala Ser Leu Tyr
85             80                  85                  90
87 gct gta aaa gtt ctc ggt gct gac ggt tcc ggc caa tac agc tgg atc    737
88 Ala Val Lys Val Leu Gly Ala Asp Gly Ser Gly Gln Tyr Ser Trp Ile
89             95                 100                 105
91 att aac gga atc gag tgg gcg atc gca aac aat atg gac gtt att aac    785
92 Ile Asn Gly Ile Glu Trp Ala Ile Ala Asn Asn Met Asp Val Ile Asn
93            110                 115                 120
95 atg agc ctc ggc gga cct tct ggt tct gct gct tta aaa gcg gca gtt    833
96 Met Ser Leu Gly Gly Pro Ser Gly Ser Ala Ala Leu Lys Ala Ala Val
97       125                 130                 135
99 gat aaa gcc gtt gca tcc ggc gtc gta gtc gtt gcg gca gcc ggt aac    881
100 Asp Lys Ala Val Ala Ser Gly Val Val Val Ala Ala Ala Gly Asn
101 140                 145                 150                 155
103 gaa ggc act tcc ggc agc tca agc aca gtg ggc tac cct ggt aaa tac    929
104 Glu Gly Thr Ser Gly Ser Ser Ser Thr Val Gly Tyr Pro Gly Lys Tyr
105             160                 165                 170
107 cct tct gtc att gca gta ggc gct gtt gac agc agc aac caa aga gca    977
108 Pro Ser Val Ile Ala Val Gly Ala Val Asp Ser Ser Asn Gln Arg Ala
109             175                 180                 185
111 tct ttc tca agc gta gga cct gag ctt gat gtc atg gca cct ggc gta    1025
112 Ser Phe Ser Ser Val Gly Pro Glu Leu Asp Val Met Ala Pro Gly Val
113             190                 195                 200
115 tct atc caa agc acg ctt cct gga aac aaa tac ggg gcg tac aac ggt    1073
116 Ser Ile Gln Ser Thr Leu Pro Gly Asn Lys Tyr Gly Ala Tyr Asn Gly
117       205                 210                 215
119 acg tca atg gca tct ccg cac gtt gcc gga gcg gct gct ttg att ctt    1121
120 Thr Ser Met Ala Ser Pro His Val Ala Gly Ala Ala Ala Leu Ile Leu
121 220                 225                 230                 235
123 tct aag cac ccg aac tgg aca aac act caa gtc cgc agc agt tta gaa    1169
124 Ser Lys His Pro Asn Trp Thr Asn Thr Gln Val Arg Ser Ser Leu Glu
125             240                 245                 250
127 aac acc act aca aaa ctt ggt gat tct ttc tac tat gga aaa ggg ctg    1217
128 Asn Thr Thr Thr Lys Leu Gly Asp Ser Phe Tyr Tyr Gly Lys Gly Leu
129       255                 260                 265
131 atc aac gta cag gcg gca gct cag taa aacataaaaa accggccttg          1264
132 Ile Asn Val Gln Ala Ala Ala Gln
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RAW SEQUENCE LISTING   DATE: 07/24/2000
PATENT APPLICATION: US/09/060,872   TIME: 17:01:07

Input Set : A:\GC527D2.APP.txt
Output Set: N:\CRF3\07242000\I060872.raw

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137 tggctccctc tgaaaatttt aacgagaaac ggcgggttga cccggctcag tcccgtaacg 1384
139 gccaagtcct gaaacgtctc aatcgccgct tcccggtttc cggtcagctc aatgccgtaa 1444
141 cggtcggcgg cgtttttcctg ataccgggag acggcattcg taatcggatc          1494
144 <210> SEQ ID NO: 2
145 <211> LENGTH: 382
146 <212> TYPE: PRT
147 <213> ORGANISM: Bacillus amyloliquefaciens
149 <400> SEQUENCE: 2
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153 Ile Phe Thr Met Ala Phe Gly Ser Thr Ser Ser Ala Gln Ala Ala Gly
154             20                  25                 30
156 Lys Ser Asn Gly Glu Lys Lys Tyr Ile Val Gly Phe Lys Gln Thr Met
157         35                  40                 45
159 Ser Thr Met Ser Ala Ala Lys Lys Asp Val Ile Ser Glu Lys Gly
160     50                  55                 60
162 Gly Lys Val Gln Lys Gln Phe Lys Tyr Val Asp Ala Ala Ser Ala Thr
163 65                  70                  75                 80
165 Leu Asn Glu Lys Ala Val Lys Glu Leu Lys Lys Asp Pro Ser Val Ala
166             85                  90                 95
168 Tyr Val Glu Glu Asp His Val Ala His Ala Tyr Ala Gln Ser Val Pro
169             100                 105                110
171 Tyr Gly Val Ser Gln Ile Lys Ala Pro Ala Leu His Ser Gln Gly Tyr
172         115                 120                125
174 Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp Ser Gly Ile Asp Ser
175     130                 135                 140
177 Ser His Pro Asp Leu Lys Val Ala Gly Gly Ala Ser Met Val Pro Ser
178 145                 150                 155                160
180 Glu Thr Asn Pro Phe Gln Asp Asn Asn Ser His Gly Thr His Val Ala
181             165                 170                175
183 Gly Thr Val Ala Ala Leu Asn Asn Ser Ile Gly Val Leu Gly Val Ala
184             180                 185                190
186 Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu Gly Ala Asp Gly Ser
187         195                 200                205
189 Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu Trp Ala Ile Ala Asn
190     210                 215                220
192 Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly Pro Ser Gly Ser Ala
193 225                 230                 235                240
195 Ala Leu Lys Ala Ala Val Asp Lys Ala Val Ala Ser Gly Val Val Val
196             245                 250                255
198 Val Ala Ala Ala Gly Asn Glu Gly Thr Ser Gly Ser Ser Ser Thr Val
199             260                 265                270
201 Gly Tyr Pro Gly Lys Tyr Pro Ser Val Ile Ala Val Gly Ala Val Asp
202         275                 280                285
204 Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Val Gly Pro Glu Leu Asp
205     290                 295                300
207 Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr Leu Pro Gly Asn Lys
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208 305                   310                  315                   320
210 Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Ser Pro His Val Ala Gly
211                       325                  330                   335
213 Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn Trp Thr Asn Thr Gln
214                       340                  345                   350
216 Val Arg Ser Ser Leu Glu Asn Thr Thr Thr Lys Leu Gly Asp Ser Phe
217                       355                  360                   365
219 Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala Ala Ala Gln
220         370                  375                  380
223 <210> SEQ ID NO: 3
224 <211> LENGTH: 275
225 <212> TYPE: PRT
226 <213> ORGANISM: Bacillus subtilis
228 <400> SEQUENCE: 3
229 Ala Gln Ser Val Pro Tyr Gly Ile Ser Gln Ile Lys Ala Pro Ala Leu
230   1                 5                  10                   15
232 His Ser Gln Gly Tyr Thr Gly Ser Asn Val Lys Val Ala Val Ile Asp
233                   20                  25                   30
235 Ser Gly Ile Asp Ser Ser His Pro Asp Leu Asn Val Arg Gly Gly Ala
236             35                  40                   45
238 Ser Phe Val Pro Ser Glu Thr Asn Pro Tyr Gln Asp Gly Ser Ser His
239     50                  55                  60
241 Gly Thr His Val Ala Gly Thr Ile Ala Ala Leu Asn Asn Ser Ile Gly
242  65                  70                  75                   80
244 Val Leu Gly Val Ser Pro Ser Ala Ser Leu Tyr Ala Val Lys Val Leu
245                   85                  90                   95
247 Asp Ser Thr Gly Ser Gly Gln Tyr Ser Trp Ile Ile Asn Gly Ile Glu
248                 100                 105                  110
250 Trp Ala Ile Ser Asn Asn Met Asp Val Ile Asn Met Ser Leu Gly Gly
251         115                 120                 125
253 Pro Thr Gly Ser Thr Ala Leu Lys Thr Val Val Asp Lys Ala Val Ser
254     130                 135                 140
256 Ser Gly Ile Val Val Ala Ala Ala Ala Gly Asn Glu Gly Ser Ser Gly
257 145                 150                 155                  160
259 Ser Thr Ser Thr Val Gly Tyr Pro Ala Lys Tyr Pro Ser Thr Ile Ala
260                 165                 170                  175
262 Val Gly Ala Val Asn Ser Ser Asn Gln Arg Ala Ser Phe Ser Ser Ala
263                 180                 185                  190
265 Gly Ser Glu Leu Asp Val Met Ala Pro Gly Val Ser Ile Gln Ser Thr
266         195                 200                 205
268 Leu Pro Gly Gly Thr Tyr Gly Ala Tyr Asn Gly Thr Ser Met Ala Thr
269     210                 215                 220
271 Pro His Val Ala Gly Ala Ala Leu Ile Leu Ser Lys His Pro Thr
272 225                 230                 235                  240
274 Trp Thr Asn Ala Gln Val Arg Asp Arg Leu Glu Ser Thr Ala Thr Tyr
275                 245                 250                  255
277 Leu Gly Asn Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Gln Ala
278         260                 265                 270
280 Ala Ala Gln
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281          275
284 <210> SEQ ID NO: 4
285 <211> LENGTH: 274
286 <212> TYPE: PRT
287 <213> ORGANISM: Bacillus licheniformis
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293 Gln Ala Gln Gly Phe Lys Gly Ala Asn Val Lys Val Ala Val Leu Asp
294              20                  25                  30
296 Thr Gly Ile Gln Ala Ser His Pro Asp Leu Asn Val Val Gly Gly Ala
297          35                  40                  45
299 Ser Phe Val Ala Gly Glu Ala Tyr Asn Thr Asp Gly Asn Gly His Gly
300      50                  55                  60
302 Thr His Val Ala Gly Thr Val Ala Ala Leu Asp Asn Thr Thr Gly Val
303  65                  70                  75                  80
305 Leu Gly Val Ala Pro Ser Val Ser Leu Tyr Ala Val Lys Val Leu Asn
306              85                  90                  95
308 Ser Ser Gly Ser Gly Ser Tyr Ser Gly Ile Val Ser Gly Ile Glu Trp
309              100                 105                 110
311 Ala Thr Thr Asn Gly Met Asp Val Ile Asn Met Ser Leu Gly Gly Ala
312          115                 120                 125
314 Ser Gly Ser Thr Ala Met Lys Gln Ala Val Asp Asn Ala Tyr Ala Arg
315      130                 135                 140
317 Gly Val Val Val Val Ala Ala Ala Gly Asn Ser Gly Asn Ser Gly Ser
318 145                 150                 155                 160
320 Thr Asn Thr Ile Gly Tyr Pro Ala Lys Tyr Asp Ser Val Ile Ala Val
321              165                 170                 175
323 Gly Ala Val Asp Ser Asn Ser Asn Arg Ala Ser Phe Ser Ser Val Gly
324              180                 185                 190
326 Ala Glu Leu Glu Val Met Ala Pro Gly Ala Gly Val Tyr Ser Thr Tyr
327          195                 200                 205
329 Pro Thr Asn Thr Tyr Ala Thr Leu Asn Gly Thr Ser Met Ala Ser Pro
330      210                 215                 220
332 His Val Ala Gly Ala Ala Ala Leu Ile Leu Ser Lys His Pro Asn Leu
333 225                 230                 235                 240
335 Ser Ala Ser Gln Val Arg Asn Arg Leu Ser Ser Thr Ala Thr Tyr Leu
336              245                 250                 255
338 Gly Ser Ser Phe Tyr Tyr Gly Lys Gly Leu Ile Asn Val Glu Ala Ala
339              260                 265                 270
341 Ala Gln
345 <210> SEQ ID NO: 5
346 <211> LENGTH: 269 ·
347 <212> TYPE: PRT
348 <213> ORGANISM: Bacillus lentus
350 <400> SEQUENCE: 5
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354 His Asn Arg Gly Leu Thr Gly Ser Gly Val Lys Val Ala Val Leu Asp
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VERIFICATION SUMMARY   DATE: 07/24/2000
PATENT APPLICATION: US/09/060,872   TIME: 17:01:08

Input Set : A:\GC527D2.APP.txt
Output Set: N:\CRF3\07242000\I060872.raw

L:12 M:270 C: Current Application Number differs, Replaced Current Application Number
L:13 M:271 C: Current Filing Date differs, Replaced Current Filing Date